

CLAIMS

What is claimed is:

1. An ultrasonic motor including a stator, a rotor facing the stator, and a piezoelectric element for vibrating the stator to rotate the rotor, the stator comprising:

a disk-like diaphragm; and

radially extending teeth, the number of which is odd, formed on the diaphragm, wherein each of the teeth has a contact, which contacts the rotor, wherein the piezoelectric element vibrates the teeth such that the contacts produce progressive waves to rotate the rotor, wherein a radial slit is defined by each pair of adjacent teeth, and wherein the slits are spaced apart at equal angular intervals.

2. The ultrasonic motor according to claim 1, wherein the slits and the teeth are arranged such that one of the slits and one of the teeth are angularly separated by one hundred and eighty degrees and are aligned with a diametric line.

3. The ultrasonic motor according to claim 1, wherein, when voltage is applied to the piezoelectric element, the piezoelectric element produces a predetermined number of progressive waves in the circumferential direction of the diaphragm, and wherein the number of the slits is other than a multiple of the predetermined number of the progressive waves.

4. The ultrasonic motor according to claim 1, wherein the piezoelectric element is annular and is polarized into a plurality of segments in its circumferential direction, the number of the teeth and the number of the segments are determined such that there is no correspondence between the teeth and the segments.

5. The ultrasonic motor according to claim 1, wherein the slits are made by a press die that has projections the number of which is odd and equal to or greater than three, and wherein each projection corresponds to one of the slits, and the number of slits is a multiple of the number of the projections.

6. The ultrasonic motor according to claim 1, wherein the stator includes:
a base ring, which is fixed to the diaphragm at a location of the teeth, wherein the piezoelectric element is fixed to the base ring; and
a support ring, which is located radially inside of the base ring and is fixed to the diaphragm at a location other than that of the teeth.

7. The ultrasonic motor according to claim 6, wherein the base ring and the support ring are brazed to the diaphragm.

8. An ultrasonic motor including a stator, a rotor facing the stator, and a piezoelectric element for vibrating the stator to rotate the rotor, the stator comprising:
a disk-like diaphragm; and
an odd number of teeth formed on the diaphragm, wherein the teeth extend radially and are spaced apart at equal angular intervals, wherein a radial slit is defined by each pair of adjacent teeth, wherein each tooth has a contact, which contacts the rotor, and wherein the piezoelectric element vibrates the teeth such that the contacts produce progressive waves to rotate the rotor.

9. An ultrasonic motor including a stator, a rotor facing the stator, and a piezoelectric element for vibrating the stator to rotate the rotor, the stator comprising:
a disk-like diaphragm; and
a plurality of radial teeth formed on the diaphragm, wherein each tooth has a contact, which contacts the rotor, wherein the piezoelectric element vibrates the teeth such that the contacts produce progressive waves to rotate the rotor, wherein a radial slit is defined by each pair

of adjacent teeth, wherein the slits and the teeth are arranged such that one of the slits and one of the teeth are angularly separated by one hundred and eighty degrees and are aligned with a diametric line.